

## Synergistic and Antagonistic Interactions between Garlic Extracts and Metformin in Diabetes Treatment

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**Abstract :** Abstract—The worldwide increasing of using herbs in form of medicine with or without prescription medications potentiates the interactions between herbal products and conventional medicines; due to more research for herb-drug interactions are needed. for a long time hyperglycemia had been treated with several medicinal plants. *A. sativum*, belonging to the Liliaceae family is well known for its medicinal uses in African traditional medicine, it used for treating of many human diseases mainly diabetes, high cholesterol and high blood pressure. The purpose of this study is to determine the interaction effect between *A. sativum* bulb extracts and metformin drug used in diabetes treatment. The in vitro and in vivo evaluation were conducted by glucose reuptake using isolated rats hemidiaphragms tissue and by estimate glucose tolerance in glucose-loaded wistar albino rats. The results showed that, petroleum ether, chloroform and ethyl acetate extracts were found to have activity of glucose uptake in isolated rats hemidiaphragms of 24.11 mg/g, 19.07 mg/g and 15.66 mg/g compared to metformin drug of 17 mg/g. These activity were reduced to 17.8 mg/g, 13.59 mg/g and 14.46 mg/g after combination with metformin, metformin itself reduced to 13.59 mg/g, 14.46 mg/g and 12.71 mg/g in combination with chloroform and ethyl acetate. These decrease in activity could be due to herbal-drug interaction between the extracts of *A. sativum* bulb and metformin drug. The interaction between *A. sativum* extract and metformin was also shown by in vivo study on the induced hyperglycemic rats. The glucose level after administered of 200 mg/kg was found to be increase with 47.2 % and 17.7% at first and second hour compared to the increase of blood glucose in the control group of 82.6% and 76.7%. At fourth hour the glucose level was became less than normal with 3.4% compared to control which continue to increase with 68.2%. Dose of 400 mg/kg at first hour showed increase in blood glucose of 31.5 %, at second and fourth hours the glucose level was became less than normal with decrease of 3.2 % and 30.4%. After combination the activity was found to be less than that of extract at both high and low dose, whereas, at first and second hour, the glucose level was found to be increase with 50.4% and 21.2%, at fourth hour the glucose level was became less than normal with 14%. Therefore *A. sativum* could be a potential source for anti-diabetic when it used alone, and it is significant important to use the garlic extract alone instead of combined with Metformin drug in diabetes-treatment.

**Keywords :** Antagonistic, Garlic, Metformin, Synergistic

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